We claim:

1. A method for forming a low dielectric constant structure on a semiconductor substrate by CVD processing, comprising the steps of:

- introducing a material gas into a reaction chamber for CVD processing, wherein a semiconductor substrate is placed, said material gas comprising a silicon-containing chemical compound having the formula of

$(R^1\text{-}R^2)_n\text{-}Si\text{-}(X^1)_{4-n}$,

wherein
X^1 is hydrogen, halogen, acyloxy, alkoxy or OH group,
R^2 is an optional group and comprises an aromatic group having 5 to 7 carbon atoms, and
R^1 is a substituent at position 4 of R^2 or a group directly linked to Si, selected from hydrocarbyl groups having from 1 to 30 carbons;
n is an integer 1-3; and

- forming a silicone polymer film on the semiconductor substrate by activating a polymerization reaction in the reaction chamber where the material gas is present until the relative dielectric constant of the silicone polymer film is lower than a predetermined value.

2. The method of claim 1, wherein R^1 is a carbon group of from 1 to 15 carbon atoms.

3. The method of claim 1 or 2, wherein the carbon chain is fluorinated, in particular perfluorinated.

4. The method of any of claims 1 to 3, wherein R^1 is a branched carbon chain.

5. The method of any of claims 1 to 4, wherein R^1 is an alkyl group having from 1 to 4 carbon atoms, an alkenyl group having from 2 to 5 carbon atoms, an alkynyl group having from 2 to 5 carbon atoms; a polycycloalkyl group having 9 to 16 carbon atoms, optionally containing bridges; Cl or F; each of the alkyl, alkenyl, alkynyl and polycycloalkyl groups being optionally substituted.

6. The method of claim 5, wherein the alkyl, alkenyl, alkynyl and polycycloalkyl groups are substituted by 1 to 5, in particular 1 to 3 halogen or perhalogen substitutents, or the polycycloalky groups being substituted with 1 to 3 alkyl substitutents, which optionally carry 1 to 6 halogen substitutents, e.g. chloro, fluoro or bromo.

7. The method of any of claims 1 to 6, wherein R^1 is selected from the group consisting of CF_3, CF_2CF_3, $CF_2CF_2CF_3$, CF_2OH, CF_2CF_2OH, a cycloalkyl having 5 to 10 carbon atoms, optionally substituted with 1 to 3 fluoro or perfluoro groups, a hydrocarbyl group having a carbon chain with a carbon-carbon double bond and from 2 to 5 carbons; vinyl groups, acrylic group, alkenyl groups having from 1 to 4 carbons; and aromatic groups having from 5 to 7 carbon atoms.

8. The method of any of claims 1 to 6, wherein R^1 is CH_2, CH_2CH_3, $(CH_2)_2CH_3$, $(CH_2)CF_3$, CH_2CH_2OH or CH_2CF_2OH.

9. The method of claim 7 or 8, wherein R^1 is linked via a group R^2 or directly to $-Si-(X^2)_3$, where X^2 is a halogen

10. The method of claim 1, wherein X^1 and X^2 are independently selected from chlorine.

11. The method of any of claims 1 to 10, wherein R^2 is selected from the group consisting of aromatic groups having from 5 to 7 carbon atoms, in particular 5 or 6 carbon atoms, and non-aromatic ring structures having from 5 to 10 carbons.

12. The method of claim 11, wherein R^2 is an optionally substituted phenyl group.

13. The method of any of the preceding claims, wherein R^2 is further substituted at positions 3 and 5.

14. The method of any of the preceding claims, wherein R^2 is substituted at positions 3 and 5 with CF_3.

15. The method of claim 1, wherein X^1 is selected from the group consisting of alkoxy groups, acyloxy groups, OH groups.

16. The method of claim 1, wherein X^1 is an ethoxy group.

17. A poly(organo siloxane) compound formed via CVD process comprising a repeating Si-O backbone, carbon chain crosslinking groups and $-R^1-R^2$ bound to from 5 % to 60 % of the silicon atoms in the Si-O backbone, wherein R^2 is an aromatic group having 6 carbon atoms and R^1 is a substituent at position 4 of R^2.

18. The compound of claim 17, wherein R^1 is a carbon group of from 1 to 30 carbons, in particular 1 to 15 carbons.

19. The compound of claim 17, wherein the carbon chain of R^1 or R^2 is fluorinated, in particular perfluorinated.

20. The compound of claim 17, wherein R^1 is a branched carbon chain.

21. The compound of claim 20, wherein R^1 is a carbon chain selected from the group consisting of CF_3, CF_2CF_3, $CF_2CF_2CF_3$, CF_2OH, CF_2CF_2OH, a polycycloalkyl having 9 to 16 carbon atoms, optionally substituted with 1 to 3 fluoro or perfluoro groups or substituted with 1 to 3 alkyl substitutents, which optionally carry 1 to 6 halogen substitutents, e.g. chloro, fluoro or bromo, a hydrocarbyl group having a carbon chain with a carbon-carbon double bond and from 2 to 5 carbons; vinyl groups, acrylic group, alkenyl groups having from 1 to 4 carbons; and aromatic groups having from 5 to 7 carbon atoms.

22. The compound of any of claims 17 to 20, wherein R^1 is CH_2, CH_2CH_3, $(CH_2)_2CH_3$, $(CH_2)CF_3$, CH_2CH_2OH or CH_2CF_2OH.

23. The compound of claim 21 or 22, wherein R^1 is linked via a group R^2 or directly to $-Si-(X^2)_3$, where X^2 is a halogen

24. The compound of claim 23, wherein X^1 and X^2 are independently selected from chlorine.

25. The compound of any of claims 17 to 24, wherein R^2 is selected from the group consisting of aromatic groups having from 5 to 7 carbon atoms, in particular 5 or 6 carbon atoms, and non-aromatic ring structures having from 5 to 10 carbons.

26. The compound of claim 25, wherein R^2 is an optionally substituted phenyl group.

27. The compound of any of the preceding claims, wherein R^2 is further substituted at positions 3 and 5.

28. The compound of any of the preceding claims, wherein R^2 is substituted at positions 3 and 5 with CF_3.

29. The compound of claim 17, wherein the Si-O backbone further comprises R^3 groups bound to from 5 % to 25 % of the silicon atoms in the Si-O backbone, wherein R^3 is an alkyl group having from 1 to 10 carbon atoms, an alkenyl chain or aryl group

30. The compound of claim 29, wherein R^3 is a non-fluorinated hydrocarbon chain.

31. The compound of claim 29, wherein R^3 is partially fluorinated or perfluorinated.

32. The compound according to claim 31, wherein R^3 is selected from the group consisting of CF_3, CH_3, CH_2CH_3, CF_2CF_3, carbon chains having from 1 to 4 carbon atoms and an -OH group, CF_2OH, and CF_2CF_2OH.

33. The compound of any of claims 17 to 32, having a dielectric constant of 2.7 or less, in particular 2.5 or less, preferably 2.3 or less.

34. The compound of any of claims 17 to 33, wherein the poly(organo siloxane) compound is deposited via the CVD method from a compound having the formula R^1-R^2-Si-$(X^1)_3$, wherein R^1 and R^2 have the same meanings as above and X_1 is hydrogen, halogen, such as chlorine, an alkoxy group, such as an ethoxy group, an acyloxy group or an OH group.

35. A poly(organo siloxane) compound formed via the CVD method comprising a repeating Si-O backbone, -R^1-R^2 bound to from 25 % to 60 % of the silicon atoms in the

Si-O backbone, wherein R^2 is an aromatic group having 6 carbon atoms and R^1 is a substituent at position 4 of R^2 or a group directly linked to Si, and R^3 is bound to from 5 % to 60 % of the silicon atoms, wherein R^3 is an alkenyl group having from 2 to 5 carbon atoms, acrylic group or epoxy group.

36. The compound of claim 35, wherein R^1 is an organic group of from 1 to 30 carbons, in particular 1 to 15 carbons.

37. The compound of claim 35, wherein the carbon chain is fluorinated, in particular perfluorinated.

38. The compound of claim 35, wherein R^1 is a branched carbon chain.

39. The compound of any of claims 35 to 38, wherein R^1 is selected from the group consisting of CF_3, CF_2CF_3, $CF_2CF_2CF_3$, CF_2OH, CF_2CF_2OH, carbon chains having a carbon-carbon double bond and from 2 to 5 carbons, vinyl groups, acrylic groups, alkenyl groups having from 1 to 4 carbons, and polycycloalkyl groups having 9 to 16 carbon atoms substituted with 1 to 3 alkyl substitutents, which optionally carry 1 to 6 halogen substitutents, e.g. chloro, fluoro or bromo.

40. The compound of claim 35, wherein R^1 and R^2 are independently selected from aromatic groups having from 5 to 6 carbon atoms.

41. The compound of claim 40, wherein R^2 is a phenyl group.

42. The compound of any of claims 35 to 41, wherein R^2 is further substituted at positions 3 and 5, in particular it is substituted at positions 3 and 5 with CF_3.

43. The compound of claim 35, wherein R^2 is a non-aromatic ring structure having from 5 to 10 carbons.

44. The compound of claim 35, wherein the poly(organo siloxane) compound is deposited via the CVD method from a compound having the formula R^1-R^2-Si-$(X^1)_3$,

wherein R^1 and R^2 have the same meanings as above and X^1 is hydrogen, halogen, such as chlorine, an alkoxy group, such as an ethoxy group, an acyloxy group or an OH group.

45. The compound of claim 35, wherein R^1 is CH_2, CH_2CH_3, $(CH_2)_2CH_3$, $(CH_2)CF_3$, CH_2CH_2OH or CH_2CF_2OH.

46. The compound of any of claims 35 to 45, wherein R^3 is an epoxy group, such as glysidoxypropyl, an acrylic group, such as a methacrylic group, an alkenyl group having from 2 to 5 carbon atoms, such as vinyl.

47. The compound of claim 42, wherein R^3 is acryl.

48. The compound of any of claims 35 to 47, further comprising R^4 groups bound to from 5 to 60 % of the silicon atoms of the Si-O backbone, wherein R^4 is an alkyl group having from 1 to 30 carbon atoms, in particular 1 to 15 carbon atoms.

49. The compound of claim 48, wherein R^4 is selected from the group consisting of CH_3, CH_2CH_3, $(CH_2)_2CH_3$, CF_3, and CF_2CF_3.

50. The compound of any of claims 35 to 49, having a dielectric constant of 2.7 or less, in particular 2.5 or less, preferably 2.3 or less.

51. An integrated circuit having a layer with areas of an electrically conductive first material and an electrically insulating second material, wherein the second material is a poly(organo siloxane) compound deposited via CVD method comprising a repeating Si-O backbone, carbon chain crosslinking groups and $-R^1-R^2$ bound to from 5 % to 60 % of the silicon atoms in the Si-O backbone, wherein R^2 is an aromatic group having 6 carbon atoms and R^1 is a substituent at position 4 of R^2.

52. The integrated circuit of claim 51, wherein R^1 is a carbon group of from 1 to 30 carbons, in particular 1 to 15 carbons.

53. The integrated circuit of claim 52, wherein the carbon chain is fluorinated, in particular perfluorinated.

54. The integrated circuit of claim 52, wherein R^1 is a branched carbon chain.

55. The integrated circuit of any of claims 51 to 54, wherein R^1 is selected from the group consisting of CF_3, CF_2CF_3, $CF_2CF_2CF_3$, CF_2OH, CF_2CF_2OH, carbon chains having a carbon-carbon double bond and from 2 to 5 carbons, vinyl groups, acrylic groups, and alkenyl groups having from 1 to 4 carbons, a polycycloalkyl group having 9 to 16 carbon atoms, which can be substituted with 1 to 3 alkyl substitutents, which optionally carry 1 to 6 halogen substitutents, e.g. chloro, fluoro or bromo.

56. The integrated circuit of any of claims 51 to 55, wherein R^1 and R^2 are independently selected from aromatic groups having from 5 to 7 carbon atoms, in particular 5 or 6 carbon atoms.

57. The integrated circuit of claim 56, wherein R^2 is a phenyl group, optionally further substituted at positions 3 and 5.

58. The integrated circuit of claim 56, wherein R^2 is substituted at positions 3 and 5 with CF_3.

59. The integrated circuit of any of claims 51 to 56, wherein R^2 is a non-aromatic ring structure having from 5 to 10 carbons.

60. The integrated circuit of any of claims 51to 59, wherein the poly(organo siloxane) compound is deposited via the CVD method from a compound having the formula R^1-R^2-Si-$(X^1)_3$, wherein R^1 and R^2 have the same meanings as above and X^1 is hydrogen, halogen, such as chlorine, an alkoxy group, such as an ethoxy group, an acyloxy group or an OH group.

61. The integrated circuit of claim 51, wherein R^1 is CH_2, CH_2CH_3, $(CH_2)_2CH_3$, $(CH_2)CF_3$, CH_2CH_2OH or CH_2CF_2OH.

62. A computer comprising an integrated circuit having a layer with areas of an electrically conductive first material and an electrically insulating second material, wherein

the second material is a poly(organo siloxane) compound deposited via CVD method comprising a repeating Si-O backbone, carbon chain crosslinking groups and $-R^1-R^2$ bound to from 5 % to 60 % of the silicon atoms in the Si-O backbone, wherein R^2 is an aromatic group having 6 carbon atoms and R^1 is a substituent at position 4 of R^2.

63. A method for making an integrated circuit, comprising providing alternating areas of electrically insulating and electrically conducting materials within a layer on a semiconductor substrate, wherein the electrically insulating material comprises a poly(organo siloxane) compound deposited via CVD method comprising a repeating Si-O backbone, carbon chain crosslinking groups and $-R^1-R^2$ bound to from 5 % to 60 % of the silicon atoms in the Si-O backbone, wherein R^2 is an aromatic group having 6 carbon atoms and R1 is a substituent at position 4 of R^2 selected from an alkyl chain having from 1 to 4 carbons, an alkenyl group having from 2 to 6 carbons or OH.

64. The method of claim 63, wherein the electrically insulating material is deposited via CVD method, baked and patterned, with the electrically conductive material being deposited in removed areas of the patterned dielectric.

65. The method of claim 64, wherein the electrically conductive material comprises copper.

66. The method of claim 63, which is a dual damascene process.